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**Question Paper Code : 80308**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

First Semester

Civil Engineering

CY 6151 — ENGINEERING CHEMISTRY — I

(Common to all branches except Marine Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are Copolymers?
2. How polymers are classified on the basis of their tacticity?
3. Calculate the change in entropy accompanying the isothermal expansion of 4 moles of an ideal gas at 300K until its volume has increased three times.
4. What are the conditions for a process to be spontaneous based on the relation?  
 $\Delta G = \Delta H - T\Delta S$ .
5. Differentiate between photo-chemical and thermochemical reaction.
6. What is finger print region? Mention its important uses.
7. Calculate the number of phases and components present in the following reaction.  
 $\text{MgCO}_{3(s)} \leftrightarrow \text{MgO}_{(s)} + \text{CO}_{2(g)}$   
 $\text{NH}_4\text{Cl}_{(s)} \leftrightarrow \text{NH}_{3(g)} + \text{HCl}_{(g)}$ .
8. What is meant by 18/8 steel?
9. What are nanomaterials?
10. Write any two important applications of gold nanoparticles in medicine.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the free radical mechanism of addition polymerisation with a suitable example. (8)
- (ii) Write the preparation, properties and uses of
- (1) Nylon 6,6
- (2) Epoxy resin. (8)

Or

- (b) (i) Explain the technique, advantages and disadvantages of
- (1) Emulsion polymerization
- (2) Suspension polymerization. (8)
- (ii) Brief about the following properties of the polymers
- (1) Glass Transition Temperature
- (2) Weight average molecular weight. (8)
12. (a) (i) Discuss the criteria for a spontaneous chemical reaction. (8)
- (ii) Derive Van't Hoff isotherm. (8)

Or

- (b) (i) Derive any two Maxwell's relations. (8)
- (ii) Derive Gibbs-Helmholtz equation. (8)
13. (a) (i) What is chemiluminescence? Bring out the mechanism of chemiluminescence. (8)
- (ii) Explain the mechanism of fluorescence and phosphorescence. (8)

Or

- (b) (i) Explain the principle and instrumentation of UV-Visible Spectroscopy with a neat block diagram. (8)
- (ii) Write a notes on the types of transitions involved in organic molecule. (8)
14. (a) (i) Draw a neat one component water system and explain in detail. (8)
- (ii) Discuss in detail the lead silver system. Explain Patinson's process. (8)

Or

- (b) (i) Write a note on heat treatment of steel. (8)
- (ii) Discuss composition, properties and uses of non-ferrous alloys. (8)

15. (a) (i) Describe any two methods of synthesizing carbon nanotubes. (8)  
(ii) Distinguish molecules, nanoparticles and bulk materials. (8)

Or

- (b) (i) Discuss the applications of Nano chemistry in biology and medicine. (8)  
(ii) Explain about the properties of nanomaterial. (8)
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